

**Family list**

4 family members for:

**GB2321688**

Derived from 2 applications.

[Back to GE](#)**1 Protective jackets for storage racks**Publication info: **GB2321688 A** - 1998-08-05 ✓**GB2321688 B** - 2001-03-14**GB9801650D D0** - 1998-03-25**2 No English title available**Publication info: **GB9701844D D0** - 1997-03-19

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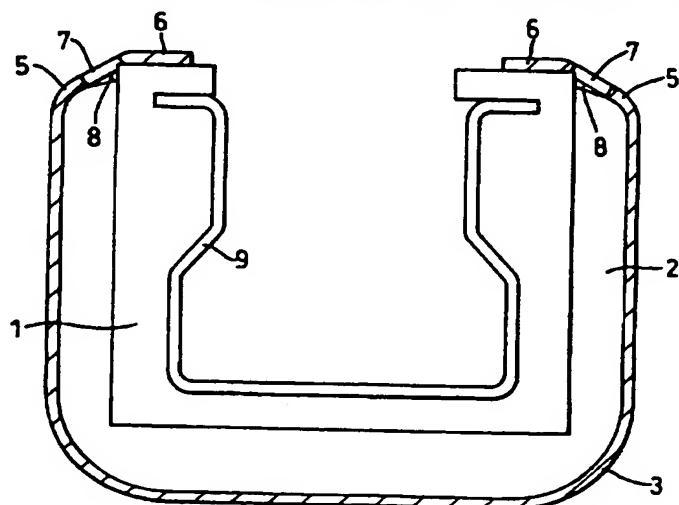
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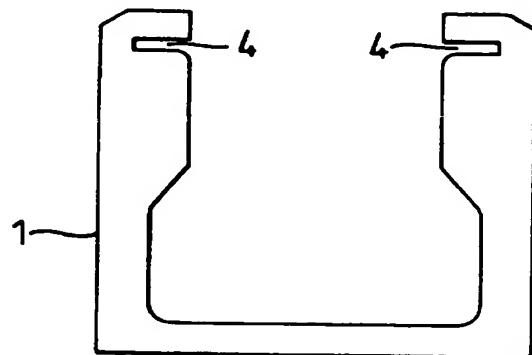
(54) Abstract Title  
**Protective jackets for storage racks**

(57) The framework of warehouse shelving has metal uprights (9) vulnerable to impacts by the loading/unloading vehicle. To reduce the incidence of damage, a length of upright most liable to damage is sheathed by a multi-part jacket (1, 2, 3), which can be fitted without any dis-assembly of the frame. An inner resilient part (1) of channel form directly embraces the upright (9), a further but stiffer resilient part (2) of channel form embraces the first part (1), and a substantially rigid outer shell (3) of channel form is slid lengthways to capture the resilient parts. Ties are fastened between its free edges to hold the assembly firm.

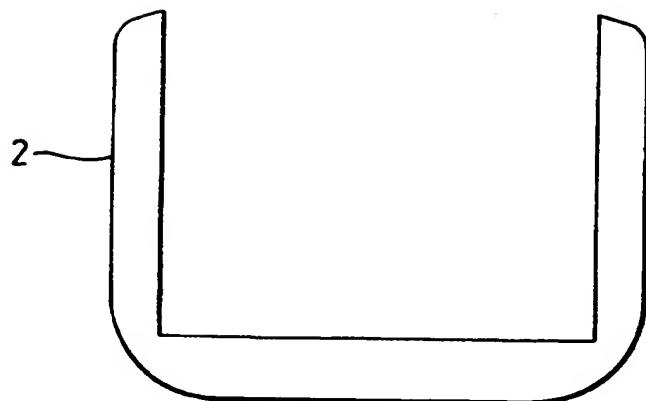
**Fig. 2**

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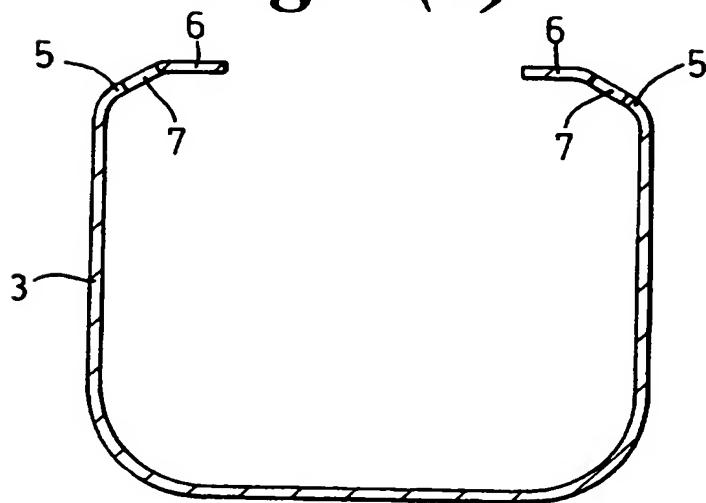
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*Fig. 1(a)*

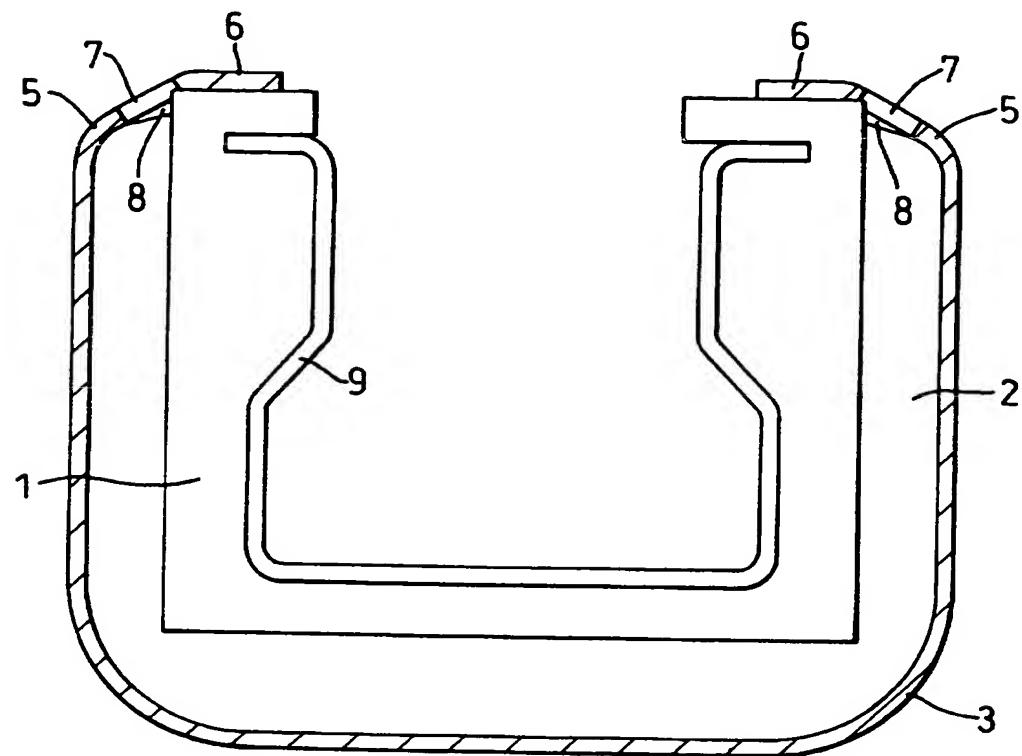


*Fig. 1(b)*

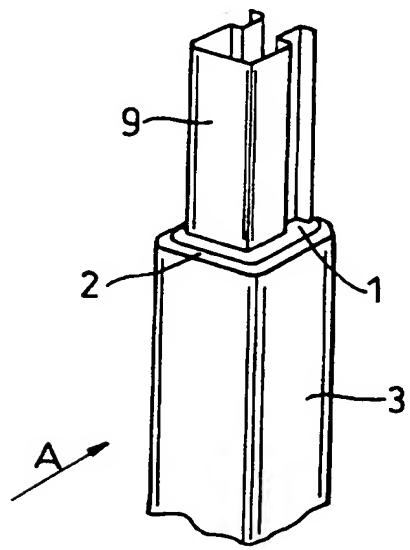


*Fig. 1(c)*

2/2



*Fig. 2*



*Fig. 3*

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Improvements Relating to  
Protective Jackets for Storage Racks

This invention relates to protective jackets for storage racks.

5       Storage racks in warehouses serviced by fork lift trucks suffer badly from those trucks being carelessly driven. The frame uprights are frequently hit, either by the truck itself or by the pallet and the load it is carrying, and if they bend more than a small amount out of  
10      true, then they have to be replaced. This is a time consuming and expensive operation.

One answer to this is to make the racking, or at least the uprights which are most likely to be damaged, of much heavier gauge metal. But that too is an expensive solution,  
15      and it is not really practical to convert all existing racks in this manner.

According to the present invention there is provided a protective jacket for metal frame members, the jacket being of channel form enabling it to be fitted over a frame member  
20      intermediate that member's captive ends and comprising a substantially rigid outer shell and a resilient inner lining shaped to fit closely around the frame member to be protected and internally to the shell.

Preferably, the lining will initially be free of the  
25      shell to enable it to be fitted around the frame member before the shell. That is offered up to embrace the frame member elsewhere and then slid lengthwise to envelope the lining.

Advantageously, the lining has different resilience through its thickness, and it may be softer on the inside, adjacent the frame member, and harder towards the shell. This can be achieved by composing the lining of two or more 5 distinct layers which may or may not be bonded together.

Alternatively the lining could be of foam with graduated density.

The shell may be of polycarbonate, which has the advantage of being transparent. Warning signs or flashes 10 could therefore be sandwiched between the lining and shell to show through the latter, and remain fully protected. However, such material is expensive and therefore it may be preferred to make the shell in another material, such as high density polypropylene.

To retain the jacket in place, the outer shell may have means enabling the free edges of its sides to be urged 15 towards one another. This will clamp the jacket around the frame member. Conveniently these urging means are simply ties through holes in the edge portions of the sides.

Plastics cable ties which tighten on the ratchet principle 20 are particularly suitable.

For a better understanding of the invention, one embodiment will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows end views of the components of a 25 protective jacket for the frame member of a rack,

Figure 2 is a cross-section, to an enlarged scale, of the assembled jacket around a frame member, and

Figure 3 is a diagrammatic perspective view of the frame member equipped with such a protective jacket.

The jacket comprises an inner lining 1 (Figure 1(a)) an outer lining 2 (Figure 1 (b)) and a shell 3 (Figure 1(c)).

5 The inner lining is of relatively soft resilient foam material compared with the outer lining 2, which is quite firm but not rigid. The shell is substantially rigid, but with some springiness.

10 The inner lining 1 is channel shaped, its exterior profile being a simple square U and its interior profile being shaped to fit closely around a frame member here assumed to be of generally Ω-shaped cross-section. Thus near the edges of the flanges of the lining 1 there are slots 4 to receive the edge portions of the frame member.

15 The outer lining 2 is also channel shaped, its interior profile being a square U closely to receive the inner lining and its outer profile being similar, but with rounded corners and edges.

20 The shell 3 is a uniform thickness channel member and matches the outer profile of the lining 2 except that towards its edges it is bent inwardly in two stages, first, inner edge portions 5 being inclined to the sides and second, outer edge portions 6 being perpendicular to the sides and projecting directly towards each other. At 25 intervals along the inner edge portions 5 there are apertures 7.

These members fit together as shown in Figure 2, each inner edge portion 5 of the shell 3 leaving a small gap 8 as

it spans over to the inner lining 1, where the outer edge portion 6 bears on that lining.

The linings 1 and 2 are separate from the shell 3 and are fitted first to an upright 9 of a rack frame. Their 5 resilience means that these flanges can be spread apart as they are offered up horizontally in the direction A of Figure 3. They then revert to their natural shape where they fit snugly around the upright.

The shell 3 is then loosely fitted around the upright 10 9 above the linings 1 and 2. The distance between the outer edge portions 6, the geometry of the shell and the upright, and the ability of the sides of the shell to be spread slightly means that the shell can be sprung over and loosely embrace the upright 9. The shell is then slid down over the 15 linings 1 and 2, making those captive.

Finally, ties are worked through the apertures 7 and tightened between opposite edge portions to clamp the jacket around the upright 9. The gaps 8 and the relative softness of the inner lining 1 mean that the end of a plastics cable 20 tie can quite easily be poked through in either direction.

It will be understood that the inner profile of the inner lining 1 is dictated by the cross-section of the frame member that is to be protected, and therefore there will have to be other inner linings for different frame members. 25 However it is expected that the outer lining 2 and the shell 3 will be able to serve different frames.

Figure 3 shows the completed jacket in place, and it will be appreciated that if it does suffer an impact, the

effect will be diffused by virtue of the linings. The upright 9 will remain straight unless the blow is severe.

As a tell-tale that there might be concealed damage to the upright, the shell 3 could have a coating that will 5 crack or locally flake off when hit hard. This would reveal another colour underneath, which would be immediately apparent. Checking the upright is then just a matter of sliding the jacket up to reveal the protected length.

Sensors could also be incorporated in the jacket to 10 generate an audible or visible alarm when the jacket is struck a heavy blow.

CLAIMS

1. A protective jacket for metal frame members, the jacket being of channel form enabling it to be fitted over a frame member intermediate that member's captive ends and  
5 comprising a substantially rigid outer shell and a resilient inner lining shaped to fit closely around the frame member to be protected and internally to the shell.

2. A protective jacket as claimed in Claim 1, wherein the lining is initially free of the shell to enable fitting  
10 around the frame member before the shell, embracing the fine member elsewhere, is slid lengthwise to envelope the lining.

3. A protective jacket as claimed in Claim 1 or 2, wherein the lining has a different resilience through its thickness.

15 4. A protective jacket as claimed in Claim 3, wherein the lining is softer on inside, adjacent the frame member, harder towards the shell.

5. A protective jacket as claimed in Claim 3 or 4, wherein the lining is composed of two or more distinct  
20 layers.

6. A protective jacket as claimed in Claim 5, wherein the layers are not bonded together.

7. A protective jacket as claimed in Claim 3 or 4, wherein the lining is of foam with graduated density.

25 8. A protective jacket as claimed in any preceding claim, wherein the shell is of polycarbonate.

9. A protective jacket as claimed in any preceding

Claim 8, wherein the shell is transparent and warning flashes, signs or marks are sandwiched between shell and lining.

10. A protective jacket as claimed in any one of  
5 Claims 1 to 7, wherein the shell is of high density polypropylene.



The  
Patent  
Office  
X

Application No: GB 9801650.4  
Claims searched: 1 to 10

Examiner: Colin Thompson  
Date of search: 28 May 1998

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): F2S (SCF); A4L (LAEB, LAEC); B7B (BSDB)

Int Cl (Ed.6): F16F 1/44, 7/12; B60R 21/04, 21/055; B65D 81/05

Other: Online: WPI, EDOC, JAPIO

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X,P	GB 2308340 A (Rover Group Ltd) See especially Figs 1 & 2	1
X	GB 2055446 A (Nissan Motor Co Ltd) See Fig 6	1
X	GB 1446370 A (Ford Motor Co Ltd) See especially Fig 5	1
X	EP 0736421 A1 (Ford Motor Co Ltd) See Figs 4-7	1
X	EP 0676315 A1 (Ford Motor Co Ltd) See Fig 2	1
X	EP 0520167 A1 (Mercedes-Benz AG) See Fig 2	1
X	US 3836043 A (Levin) Whole document relevant	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.